

## PROTECTIVE DEVICE FOR A MOTOR VEHICLE

## FIELD OF THE INVENTION

[0001] The invention relates to a protective covering device for use inside a motor vehicle and comprising a flat sheet which is movably supported between a compactly rolled-up rest position and a pulled-out deployed position, which flat sheet is supported over its pull-out path in guideways in the sides of the vehicle, a drive system being associated with opposite sides of the flat sheet and synchronously driven through a synchronization structure.

## BACKGROUND OF THE INVENTION

[0002] One such protective device is known in the form of a cargo-space cover from DE 198 25 353 C2. The known cargo-space cover has a web-like flat sheet which is movably arranged between a rest position and a pulled-out deployed position in the cargo space. A pull-out bar is provided at one front end of the web-like flat sheet, which pull-out bar is guided on opposing sides by a carrier. The carriers arranged on opposing vehicle sides are part of a drive strand and are each movable in longitudinal direction of the cargo space by this drive strand. By moving the carriers, the pull-out bar is also moved, thus causing the flat sheet to be pulled out or wound up in a corresponding manner. An electric drive system is associated with each drive strand on each vehicle side. The two electric drive systems can be driven synchronously by means of an electronic speed governor, which guarantees that the carriers are guided in synchronism.

[0003] The purpose of the invention is to create a protective device of the above-mentioned type which enables through simple means a precise movement of the flat sheet.

#### SUMMARY OF THE INVENTION

[0004] This purpose is attained by two drive systems being connected through a mechanical synchronization gearing assembly. The inventive solution achieves an extremely simple and inexpensively designed, robust and operationally safe synchronization. By means of extremely few, nonelectric components, it is possible to achieve a synchronization of the drive systems utilizing components which are insensitive to high temperature and humidity fluctuations and similar situations.

[0005] The synchronization gearing assembly has in one embodiment of the invention an elongated transfer means coupled to the two drive systems. The elongated transfer means bridges the distance between the drive systems. In case the drive systems are integrated on opposite vehicle sides in respective side walls of a cargo space of a motor vehicle, the transfer means is guided preferably either under the floor area or over the roof area of the cargo space. The transfer means is designed flexibly in an advantageous manner in order to enable deviations of the power transfer.

[0006] A further embodiment of the invention provides as the transfer means a flexible push/pull means. As the push/pull means, which can transfer both pull and also push loads, a flexible rack, a Bowden cable or similar structure are preferably provided.

[0007] A further embodiment of the invention provides as the transfer means a flexible torque-transfer shaft coupled to drive shafts of the drive systems. A flexible threaded spindle is provided in particular as the flexible torque-transfer shaft, which threaded spindle is coupled to corresponding threaded worms in the area of the drive shafts of the drive systems.

[0008] Further advantages and characteristics of the invention will become apparent to those skilled in the

art following a reading of the herein provided description of one preferred embodiment of the invention and with reference to the accompanying drawing.

#### BRIEF DESCRIPTION OF THE DRAWING

[0009] The single drawing illustrates schematically one embodiment of the inventive protective device for a cargo space of a motor vehicle.

#### DETAILED DESCRIPTION

[0010] In addition to protective devices serving as cargo-space covers, there is also known in the marketplace cargo-space separators and sun-protection systems for use in the area of motor-vehicle windows.

[0011] In a cargo space 1 of a motor vehicle, in the present case a station wagon, there is provided as a protective device a cargo-space cover 3 which is positioned directly behind a back-rest arrangement of a bench and extends between opposing side walls 2 of the cargo space 1. The cargo-space cover 3 has a cassette housing which is fixedly anchored to the vehicle in the area of the back-rest arrangement or in the area of the opposing side walls 2. A web-like flat sheet, which can be rolled up, is supported in the cassette housing. The flat sheet is, for this purpose, fastened on a roller shaft which is rotatably supported in the cassette housing. A restoring spring acts in a basically known manner onto the roller shaft, which restoring spring loads, as a drive system in the form of a spring store, the flat sheet in a winding-up direction. A dimensionally stable pull-out part 4 is arranged on the front end of the flat sheet, which pull-out part is designed mainly as a contoured part. The pull-out part 4 has coupled thereto in the area of the opposing vehicle sides pull strands 5 which are guided in suitable guide elements provided in the side walls of the cargo space 1. The guide elements for each strand 5 have a drive system

6, mainly in the form of an electric motor. Other embodiments of the invention include pneumatic, hydraulic or mechanical drive systems. The pull-out part 4 is moved in response to a movement of the two drive strands 5, namely in a pull-out plane toward and away from the cassette housing.

[0012] In order to achieve at any time a synchronism of both drive systems 6, a mechanical synchronization gearing assembly, in the present case in the form of a flexible push/pull means, namely in the form of a flexible rack 7, is provided. The rack 7 is installed by means of guideways not illustrated in detail in the side walls 2 of the cargo space 1 and below a floor of the cargo space. Also, the two drive strands 5 each have a synchronous-belt or rack drive feature thereon. In order to transfer suitable rotation motion in the same direction from the electric drive motors of the drive systems 6 onto the drive strands 5, a drive pinion 8 is mounted onto each drive shaft of each drive motor 6. The drive pinions 8 each mate with a corresponding section of the rack 7 and the rack on each strand 5. In addition, each drive pinion 8 of the two drive systems 6 mating with the rack 7 serves to synchronize the movements of the pinions 8 by automatically transferring and in the same ratio a corresponding movement to each drive strand 5. Besides the flexible rack 7 and corresponding guideways for the flexible rack 7, which guideways are installed inside of the vehicle, no further components are needed in order to achieve the desired mechanical synchronization of the two drive systems 6.